81-17

FOREST PEST MANAGEMENT
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EVALUATION OF PESTS ON THE MT. PINOS RANGER DISTRICT, LOS PADRES NATIONAL FOREST

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ABSTRACT

Annosus root disease was found at three locations on the Mt. Pinos Ranger District. Black stain root disease was not found at a suspect location. Pinyon needlescale and an undescribed scale in the genus Toumeyella are causing severe decline in pinyon pine near the Ridgelite Mine. The Jeffrey pine beetle, pine engravers and the California flatheaded borer pose a potential problem on weakened trees within the Lockwood Burn, particularly in roadside and recreation areas. Pocket gophers are causing damage in several plantations in the Frazier Mt. area, and a survey this fall is recommended to assess control needs. Clipping by brush rabbits and barking injuries by gray squirrels were observed. Management options for the diseases, insects , and vertebrates are given to aid the District's decision making.

INTRODUCTION

On May 13 and 14, 1981, John Pronos and John Dale from the Forest Pest Management Staff examined several pest problems on the Mt. Pinos District with Jim Wilson. Ben Harbour from the District and John Borrecco (Fisheries and Wildlife Management Staff, R.O.) joined them on May 14.

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DISEASES

ANNOSUS ROOT DISEASE (Fomes annosus)

This root disease was confirmed at three separate locations on the District. Two of the locations were at Grade Valley and on Frazier Mountain, where the major host is Jeffrey pine. The presence of Fomes annosus at the third location, Mill Potrero Campground, had been verified in a previous FPM evaluation. District personnel are well aware of the root disease problem in the campground as well as the most current information on control alternatives. Finding Fomes annosus at these widely scattered sites emphasizes the importance of continuing to apply borax to the stumps of all freshly cut conifers.

BLACK STAIN ROOT DISEASE (Ceratocystis wageneri)

Blackstain root disease was suspected of killing one Jeffrey pine near Half Moon Campground. A cross-section disc from the bole was removed and examined for the causal fungus. The discoloration in the disc was not black stain. To date this disease has not been found on the Los Padres National Forest. It is quite extensive, however, in the pinyon-juniper type on the San Bernardino National Forest and has been seen on a single Jeffrey pine there. We appreciate that the District is alert for this disease problem, since early detection of pest problems is critical to effective pest management.

DWARF MISTLETOE

Dwarf mistletoe infections of conifers were noticed in several campgrounds. Infestations can be brought under control through thorough suppression projects, and Forest Pest Management often has funds available for such activities. The initial step is to request a biological evaluation from FPM to determine if suppression would be feasible and beneficial.

INSECTS

Two insect problems were observed - one existent and one potential. The existing problem is large populations of pinyon needle scale, Matsucoccus acalyptus, and an undescribed Toumeyella species on pinyon pine near the Ridgelite Mine. The potential problem is the possible development of large populations of pine engravers (Ips spp.) and Jeffrey pine beetle (Dendroctonus jeffreyi) in trees killed and damaged during the Lockwood Fire.

SCALES

The pinyon pine in the vicinity of the Ridgelite Mine are heavily infested by two scale insects - the pinyon needle scale, Matsucoccus acalyptus, and an undescribed species in the genus Toumeyella. Tree mortality and the severe decline of many pines indicate that the problem is apparently one of

considerable duration. The abundance of a normally insignificant undescribed insect in such large numbers indicates how favorable the local habitat must be for scale insects. Should conditions favorable to the scales continue, then the ultimate result will be the elimination of most of the pinyon pine from the affected area.

The unidentified Toumeyella probably can affect trees much as the irregular pine scale, T. pinicola, affects its hosts. Severely infested trees make little growth and young trees may be killed by repeated heavy infestations. The presence of the pinyon needle scale enhances the effect, just as Toumeyella complements the destructive influence of the pinyon needle scale. The females of the Toumeyella apparently overwinter and were near the time of egg production when collected in May. It is probable that as many as 1,000 eggs may be laid per female. Upon hatching, the crawlers will disperse to feeding sites - males to needles and females to twigs at the base of the needle fascicles. In this fashion the new growth becomes infested. Large concentrations of the scale usually are covered with honeydew and sooty mold and frequently are attended by ants.

Infestations of the pinyon needle scale cause the foliage to become thin and needle length reduced. Small trees may be killed outright or seriously weakened, and large pinyons become susceptible to attack by the pinyon ips, Ips confusus. The presence of a second scale, Toumeyella sp., accentuates the effect.

In late April eggs of the pinyon needle scale are laid in masses of cottony webbing around the root collar, in the crotches of large branches and along the underside of large branches. The newly-hatched crawlers migrate to the needles of the previous year, but in cases of heavy infestations, such as Ridgelite, also settle on the new needles. Thus, in heavy infestations all needle growth is subject to the drain imposed by these sucking insects. By October the second-stage scale has come to resemble a small black bean and could be confused with the black pineleaf scale, Nuculaspis californica.

The geographical location of the pinyon decline indicates a relationship to the Ridgelite Mine. The mine produces large amounts of dust daily, and dusty conditions often are associated with heavy infestations of scales. The dust apparently interferes with the ability of parasitoids and predators to find their scale prey, and the number of scales increases rapidly once escape from their natural controls is possible. Abatement of the dust allows the natural balance of hunter and hunted to be reestablished. With two scales present in large numbers near the Ridgelite Mine, and with the effects of each reinforcing the other, the beneficial effects of dust abatement may not occur rapidly, particularly with the trees in such poor condition. Without dust abatement, tree mortality and severe decline are likely to continue.

BEETLES

A large area of pinyon-juniper and Jeffrey pine was burned in the Lockwood Fire in November 1980. Concern is limited presently to Jeffrey pines, particularly those along access routes and in nearby recreational sites. Some of these trees are dead, while others are weakened by scorch and loss

of foliage; but many remain in apparently satisfactory vigor. Pines damaged at this time of year have accumulated food reserves and their buds are hardened and protected by a scale covering. Therefore, the prospects for recovery of many pines in the Lockwood Burn would appear favorable if they escape attack by insects, and few insect attacks had occurred on the damaged pines by May 1981.

Gray and brown is the typical color of killed innerbark and cambium in pines, but those trees with intact dead foliage had innerbark that was pink to rosy crystalline, not the usual white. This innerbark also seemed less moist. This deterioration will continue and it is probable that these trees will provide little support for a generation of Jeffrey pine beetles or pine engravers, Ips spp.

Those trees which were only weakened and stressed by the fire are another matter. Subnormal winter precipitation, elimination of vegetative competition by the fire, and reduced transpiration and water needs because of diminished foliage further complicate the situation. How the combination of these conditions relates to tree stress is uncertain, but there is a potential for a rapid buildup of pine engravers in tree tops through the several generations that can be produced in one year in Southern California (Fig. 1). Such a buildup could act as a precursor to attacks by the Jeffrey pine beetle. Fortunately there were no indications of a large resident population of the Jeffrey pine beetle in and near the Burn; and with only one generation per year, June 1982 is the earliest that this insect could kill large numbers of pines.

Roadside and recreation areas such as the Half Moon Campground should be examined in late July for attacks by the Jeffrey pine beetle (Fig 2). Pitch tubes on the sides of attacked trees are apt to be small because of the weakened condition of the trees and subnormal soil moisture. The area should be observed periodically for fading tree tops that indicate attack by pine engravers. There was no expression of engraver attack in pine tops in May, but at that date recent attacks would not produce fading foliage. Fortunately, slash that could contribute suitable host material is not being created.

Pines under stress can be suitable hosts for the California flatheaded borer, Melanophila californica. The borer may kill trees outright, but more often than not it is found in trees along with bark beetles. Some trees attacked repeatedly by only flatheaded borers do not die, but they show a progressive decline. This decline is usually expressed by thin crowns, shorter and fewer needles, dead limbs within the living crown, and yellowish-tinted foliage.

Adult beetles emerge primarily in June and July (Fig. 3), and in so doing they leave oval emergence holes in the outer bark. The adults feed on green foliage before egg-laying, which takes place from June through August. The eggs are placed under bark scales bordering on crevices. They hatch in 1-3 weeks and the newborn larvae mine directly to the innerbark. Resin may flow from these entrance points and produce resin streaks on the bole that are the only indications of attack until the crown fades. The larvae may grow steadily larger and mature in one season, or the development may be slow. Such "incipient larvae" may survive for 2 or even 3-4

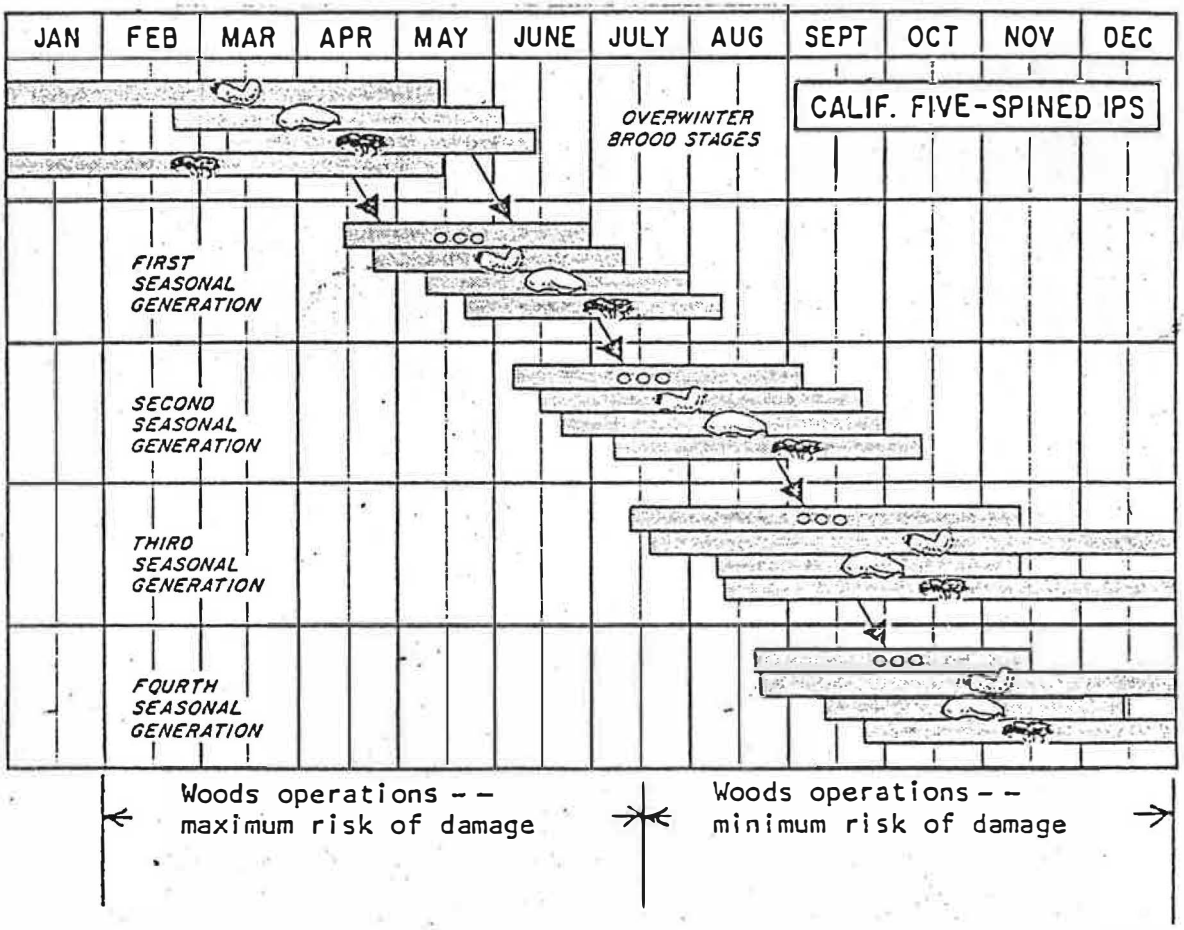

Figure 1. Generalized life history of Pine Engravers, Ips spp., in pine slash and tree tops.

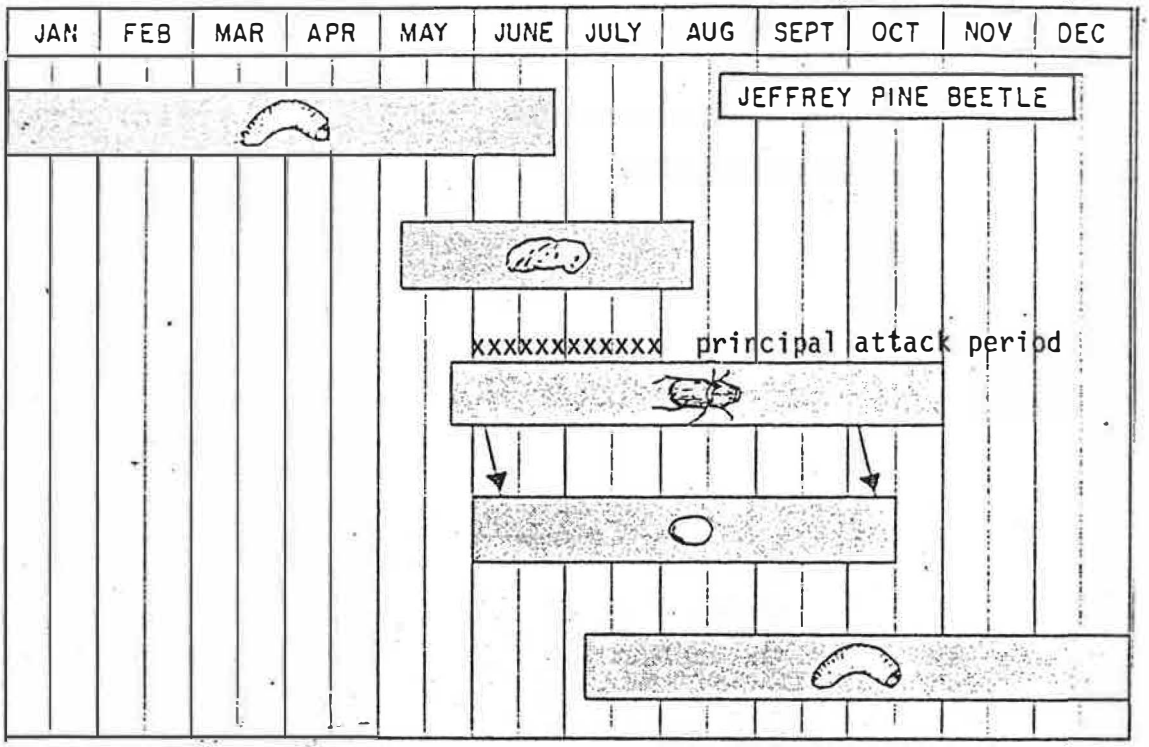

Figure 2. Generalized life history of the Jeffrey Pine Beetle.

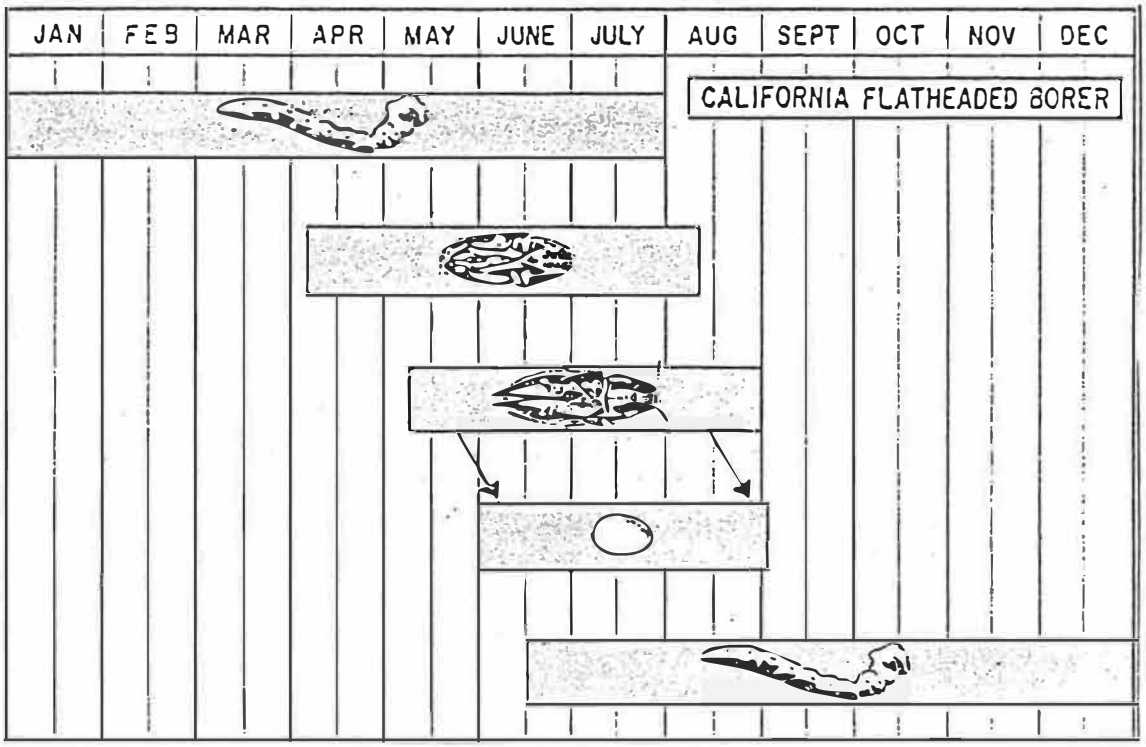

Figure 3. Generalized life history of the California Flatheaded Borer.

years, but their mortality rate is high. When the host dies or is dying, the incipient larvae enter a phase of rapid development. This usually occurs in June. Pupation occurs the following spring and adults emerge in the same season as those that develop in one year. If the host recovers, the larvae eventually die and their galleries become encased.

This insect could contribute to mortality of survivors in the Lockwood Burn. Surveillance for top-kill by pine engravers and attacks by the Jeffrey pine beetle should include binocular viewing for resin streaking on the upper boles.

It presently appears that few problems will develop in 1981 because of the low resident insect population. However, much depends upon return to normal precipitation patterns in 1981-82. A continued subnormal pattern will further stress the trees and may necessitate a reevaluation in the spring of 1982.

MANAGEMENT ALTERNATIVES FOR INSECTS

SCALES

1. Do nothing. Tree killing and general decline of the pinyon pine will continue, with the population levels of the scales varying from year to year. Ultimately most of the pinyon pine may be eliminated from the affected area.

2. Abate the dust. This will provide long-range improvement for the pines as the predators and parasitoids of the scales adjust to a more favorable environment.

3. Spray the trees with an appropriate insecticide[1]. This would provide the trees short-term relief if it slowed the mortality rate or allowed the pines to recover some of their former vigor. However, scales

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1/ Many insecticides are registered for scale insect suppression. They vary in active ingredient, formulation, method of application, efficacy, effects on non-target organisms, and residual life. If the District contemplates insecticide application, Forest Pest Management personnel should be consulted to assist in selection of the appropriate material.

Insecticides serving as protective sprays to prevent bark-beetle kills (next page) are in a state of change: some are registered and others are being field tested. This gives them varied registration status at any time. As with scale insect insecticides, if the District contemplates use of protective sprays, there should be close consultation with FPM in selecting the material appropriate to meet the District's needs.

If projects for protection from insects are warranted, FPM funding would probably be available. (Details, including criteria, are given in FSM 3450.)

are some of the most difficult of insects to suppress with chemicals and such an action would not correct the condition(s) that originally favored the scales. Without such a correction the prognosis would be for damaging populations to quickly reappear.

4. Combination of Numbers 2 and 3. This would provide short-term relief as well as long-range improvement. The scale population would be reduced and a favorable adjustment in the environment would assist in maintaining subsequent populations at endemic levels.

BEETLES

1. Do nothing. The resource manager would remain unaware of developing insect problems. Loss of valuable campground trees might occur before preventive action could be taken.

2. Monitor stand and tree conditions every 30 days. This would allow subjective estimates of recovery from fire damage, and would provide current information on the activity of bark beetles. The resource manager would then be aware of any developing problems and could seek further assistance from FPM.

3. Promote tree vigor in campgrounds. Any steps that lessen stress and competition will favor the ability of the trees to resist attack. Examples include the thinning of distinct areas of high basal area and pruning of brooms from pines infected with dwarf mistletoe.

4. Protective sprays in campgrounds[1]. Should threatening populations of Jeffrey pine beetle develop, protective insecticide sprays could be applied to the boles of particularly valuable trees.

ANIMAL DAMAGE

POCKET GOPHER

Recent pocket gopher (Thomomys bottae) activity in the form of mounds and winter casts was seen at several sites. The Lower Frazier plantation of Jeffrey pine had low to moderate lovels of pocket gopher activity. Site preparation had been accomplished by disking to remove the dense brush cover. Pocket gophers are not usually abundant in dense brush, although they often occur in openings in the brush canopy. Removal of brush and disturbance of the soil favors the development of herbaceous vegetation and pocket gopher habitat.

The Frazier Mine plantation had been site prepared by burning and planted with Jeffrey pine. Few seedlings remain and pocket gopher activity was heavy.

1/ See footnote on previous page.

Wherever pocket gophers occur, some mortality to planted seedlings can be expected. The need for control efforts depends on management objectives, stocking levels, and pocket gopher numbers or activity levels. Gopher-mound surveys (see the Animal Damage Control Handbook, FSH 2609.22) are often used to assess the potential for pocket gopher damage and the need for control. A gopher-mound survey taken this fall on the Lower Frazier Plantation would be valuable in assessing control needs. Gopher activity on 25 percent or more of the plots would indicate sufficient activity to adversely impact forest regeneration.

RABBIT

Some pine seedlings on the Lower Frazier plantation had been clipped by rabbits shortly after planting. "Vexar" seedling protectors were installed on some seedlings when rabbit activity was first observed. The Frazier Mountain area occurs within the range of three members of the rabbit family: the black-tailed jackrabbit (Lepus californicus), desert cottontail (Sylvilagus audubonii), and brush rabbit (S. bachmani). While any of these could have caused the injuries, the brush rabbit is the most likely culprit. Preferred habitat for brush rabbits is thick brush, especially where part of the brush cover has been removed or cut to allow development of herbaceous vegetation.

WESTERN GRAY SQUIRREL

Barking injuries about 10 to 20 feet above ground on the main stem of several Jeffrey pine saplings were observed at two locations in the Frazier Mountain area. Porcupines and woodrats commonly cause these types of injuries. However, other signs like quills, fecal pellets, or wood rat nests that usually indicate the presence of these species were not found. Personnel on the San Bernardino National Forest report similar injuries caused by gray squirrels (Sciurus griseus). Jim Wilson indicated that on a previous visit he had seen what appeared to be a leaf nest high in a tree, typical of gray squirrel nests. This information suggests that gray squirrels were responsible for the girdling injuries.

The level of damage in the pine stands examined is not presently of economic magnitude to justify control measures. However, gray squirrels have caused serious losses in sapling stands elsewhere.

MANAGEMENT OPTIONS FOR ANIMALS

1. No Action. Pocket gopher populations will increase on the Lower Frazier plantation and some loss of trees will occur. Planting problems, environmental stresses, and rabbit damage contribute to seedling losses and complicate simple evaluations of gopher impact.

Failure to control gopher populations on the Frazier Mine unit prior to any replanting would likely result in another plantation failure.

2. Direct control. Direct reduction in the number of pocket gophers is the most effective approach to reducing or preventing damage. Trapping is extremely time consuming and is practical only on small areas or as a

supplement to other forms of control. Baiting with strychine-treated grain is the most practical method in forest situations. Control projects are most effective when there is fresh mound-building activity and when soil moisture is adequate to prevent collapse of the burrows. These conditions usually occur during late fall and early spring. The recommended procedure is to control gophers in the fall prior to planting, with a follow-up treatment in early spring to pick up residual animals.

3. Habitat manipulation. Control of grasses and forbs can be effective in improving seedling survival by preventing population increases or by making habitats less suitable, while also reducing vegetative competition. This approach will not eliminate problems but may significantly improve the effectiveness of direct control.

4. Physical barriers. "Vexar" seedling protectors around shoots and roots of young seedlings have provided short-term protection. However, long-term efficacy and effects on trees are still under study. This approach is most effective when integrated with other control methods.

RABBIT

1. No Action. "Vexar" tubes should provide long-term protection from rabbit clipping. Unprotected seedlings would be susceptible to feeding injuries from rabbits, although injuries to established seedlings would probably not result in mortality. Growth losses would probably occur for only a couple of years.

2. Repellent. The repellent Thiram is effective in reducing or preventing rabbit clipping, although retreatment of seedlings would be necessary when new foliage is produced.

3. Direct control. Trapping and hunting are not practical or effective approaches, and with the exception of jackrabbits, no toxic baits are registered.

4. Silvicultural practices. Removal of slash, brush, and other cover reduces the attractiveness of an area for rabbits. However, this approach is less effective on small units.

WESTERN GRAY SQUIRREL

1. No Action. While not yet a serious problem in the stands examined, gray squirrels have caused serious losses to sapling stands in southwest Oregon. Failure to monitor this situation could result in serious damage occurring. Also, opportunities could be lost to prevent damage or to correct deficiencies through silvicultural practices and direct control.

2. Monitor situation. If injuries continue and exceed three percent of the stand per year, then re-evaluation of control needs would be in order.

3. Control. Control probably should be considered only in managed stands where stocking control has been accomplished and when significant damage (3% per year) is occurring to the remaining trees. Gray squirrels

are classified as game animals, so control must be in accord with hunting regulations or by obtaining a special depredation permit. Hunting or shooting and trapping of offending individual animals have proven to be effective methods of control in southwest Oregon.